REMARKS

Claims 1-9 are pending. Claims 4-9 have been amended to improve their form, without narrowing their scope. The specification has been amended as to a matter of form. Claims 1-3, 6, 7 and 9 are the independent claims.

Claims 6-8 were rejected under 35 U.S.C. § 112, second paragraph, as indefinite. It is believed that the rejection under Section 112, second paragraph, has been obviated by the amendments to those claims, which do not affect their scope in any way, and its withdrawal is therefore respectfully requested.

The Examiner is requested to initial and return, in the next Office Action, the enclosed copy of form PTO/SB/08A. The form was originally submitted with the Information Disclosure Statement filed on June 4, 2004. In that regard, for the convenience of the Examiner, a copy of the Canadian Office Action that originally cited U.S. Patent 4,864,244 (listed on the enclosed PTO/SB/08A form) is submitted herewith.

Claims 1-9 were rejected under the judicially created doctrine of obviousness type double patenting over claims 1-26 of the U.S. Patent 6,310,513. Without conceding the propriety of the rejection, a terminal disclaimer is being filed herewith to obviate this rejection.

Claims 6, 7 and 9 were indicated as being allowable if rewritten in independent form. Since those claims have been so rewritten, they are believed in condition for allowance.

Claims 1-3 and 8 were rejected under 35 U.S.C. § 103 over admitted prior art in view of U.S. Patent 6,009,317 (Wynn). Claims 2-5 were rejected under 35 U.S.C. § 103 over admitted prior art in view of U.S. Patent 6,535,560 (Masenten). Applicant traverses and submits that independent claims 1-3 are patentable over the prior art for at least the following reasons.

Claim 1 is directed to a demodulator comprising: (a) a quadrature controller fed with a signal quadrature-detected by a quadrature detecting unit as an input signal to correct a quadrature error between phases of an in-phase component and a quadrature component of the signal based on a quadrature error signal used for correcting the quadrature error to output a corrected signal; (b) an error detection unit detecting an error signal between the in-phase component and the quadrature component of a demodulated signal output by an automatic gain controller fed with an output signal of the quadrature controller corrected for quadrature error; and (c) a quadrature error detection unit detecting the quadrature error based on the error signal to feed the quadrature error signal to the quadrature controller.

Independent claim 2 is directed to a demodulator and comprises, inter alia, a quadrature controller fed with the in-phase component and the quadrature component output from the quadrature detecting unit. The quadrature controller corrects the quadrature error between the in-phase component and the quadrature component based on an input quadrature error signal, and outputs the resulting signal. The demodulator further includes an automatic gain controller fed with the in-phase component and the quadrature component output from the quadrature controller and outputting signals corrected for amplitude errors based on the input amplitude error signal as the in-phase component and the quadrature component of a demodulated signal, an error detection unit detecting, from the in-phase component and the quadrature component of the demodulated signal output from the automatic gain controller, an in-phase component of the error signal and a polarity signal of the in-phase component of the demodulated signal, and a quadrature component of the error signal and a polarity signal of the quadrature component of the demodulated signal. An amplitude error detection unit generates an in-phase component and a quadrature component of an amplitude error signal based on the in-phase component of the error signal output from the error detection unit and the polarity signal of the in-phase component of the demodulated signal, and on the quadrature component of the error signal and the polarity signal of the quadrature component of the demodulated signal, to output the generated in-phase and

quadrature components of the amplitude error signal to the automatic gain controller. A quadrature error detection unit generates a quadrature error signal based on the in-phase component of the error signal and the polarity signal of the in-phase component of the demodulated signal, both output from the error detection unit, and on the in-phase component of the error signal and the polarity signal of the quadrature component of the demodulated signal to feed the generated quadrature error signal to the quadrature controller.

Claim 3 is directed to a demodulator that includes, inter alia, a quadrature controller fed with the in-phase and quadrature components output from the quadrature detection unit to correct the quadrature error between phases of the in-phase and quadrature components, based a quadrature error signal, an automatic gain controller fed with the in-phase and quadrature components output from the quadrature controller to output signals corrected for respective amplitude errors as in-phase and quadrature components of a demodulated signal; an error detection unit detecting an in-phase component of an error signal and a polarity signal of the in-phase component of the demodulated signal, and a quadrature component of the error signal and a polarity signal of the quadrature component of the demodulated signal, from the in-phase and quadrature components of the demodulated signal output from the automatic gain controller; and a quadrature error detection unit generating a quadrature error signal based on the in-phase component of the error signal and the polarity signal of the in-phase component of the demodulated signal, and the quadrature component of the error signal and a polarity signal of the quadrature component of the demodulated signal, all output from the error detection unit, to feed the generated quadrature error signal to the quadrature controller.

Conventionally, there has been no way for demodulators to correct for quadrature deviation produced *at the time of modulation.* By virtue of the recited features of the independent claims, a demodulator is provided that can detect and correct such errors, which originate at the time of modulation.

The Office Action conceded that the admitted prior art did not teach, inter alia, the recited quadrature error detection unit. However, the Examiner relied upon Wynn as allegedly supplying this feature. This is not correct.

Wynn is directed to a receiver that purports to accurately receive and I/Q demodulate complex modulated signals. Toward this end, Wynn determines any imbalance that may exist *at the receiver side* by generating a known signal, receiving that known signal, determining the imbalance between the quadrature and inphase components of the received known RF signal, problems that would be introduced *at the receiver side*, and, using the known discrepancy that has been determined for the receiver, and applying a correction factor to account for the receiver imbalance in receiving further transmissions. See e.g., col. 2, lines 23-41.

In Wynn, there is no mention of quadrature errors introduced *at the modulation side*, and just as in the prior art systems discussed in the background systems, the system described by Wynn cannot correct for such errors, since the use of the known signal as in Wynn can only correct for problems that originate *at the receiver*. Further, contrary to the position taken in the Office Action, Wynn does not show the features of the independent claims relating to error detection and/or error correction, and therefore cannot correct for errors, specifically quadrature deviation, introduced at the time of modulation. For at least this reason, the independent claims are believed clearly patentable over the combination of the admitted prior art and Wynn.

Independent claims 2 and 3 were also rejected over the combination of the admitted prior art and Masenten. Like Wynn, Masenten contains no teaching or suggestion of correcting quadrature deviation introduced at the modulation side. The techniques described in Masenten are for calibrating a receiver, that is, correcting for deviations that may be introduced *at the demodulation side*, which is quite different from the invention defined by

the independent claims. Further, while Masenten shows error detection, it does not teach or suggest the recited features of the independent claims, which correct for quadrature errors introduced at the modulation side. For at least these reasons, the independent claims are patentable over the combination of Masenten and the admitted prior art.

The other claims in this application are each dependent from one or another of the independent claims discussed above and are therefore believed patentable for the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, however, the individual reconsideration of the patentability of each on its own merits is respectfully requested.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

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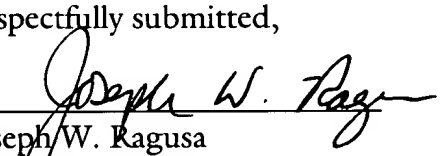
Respectfully submitted,

By 

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